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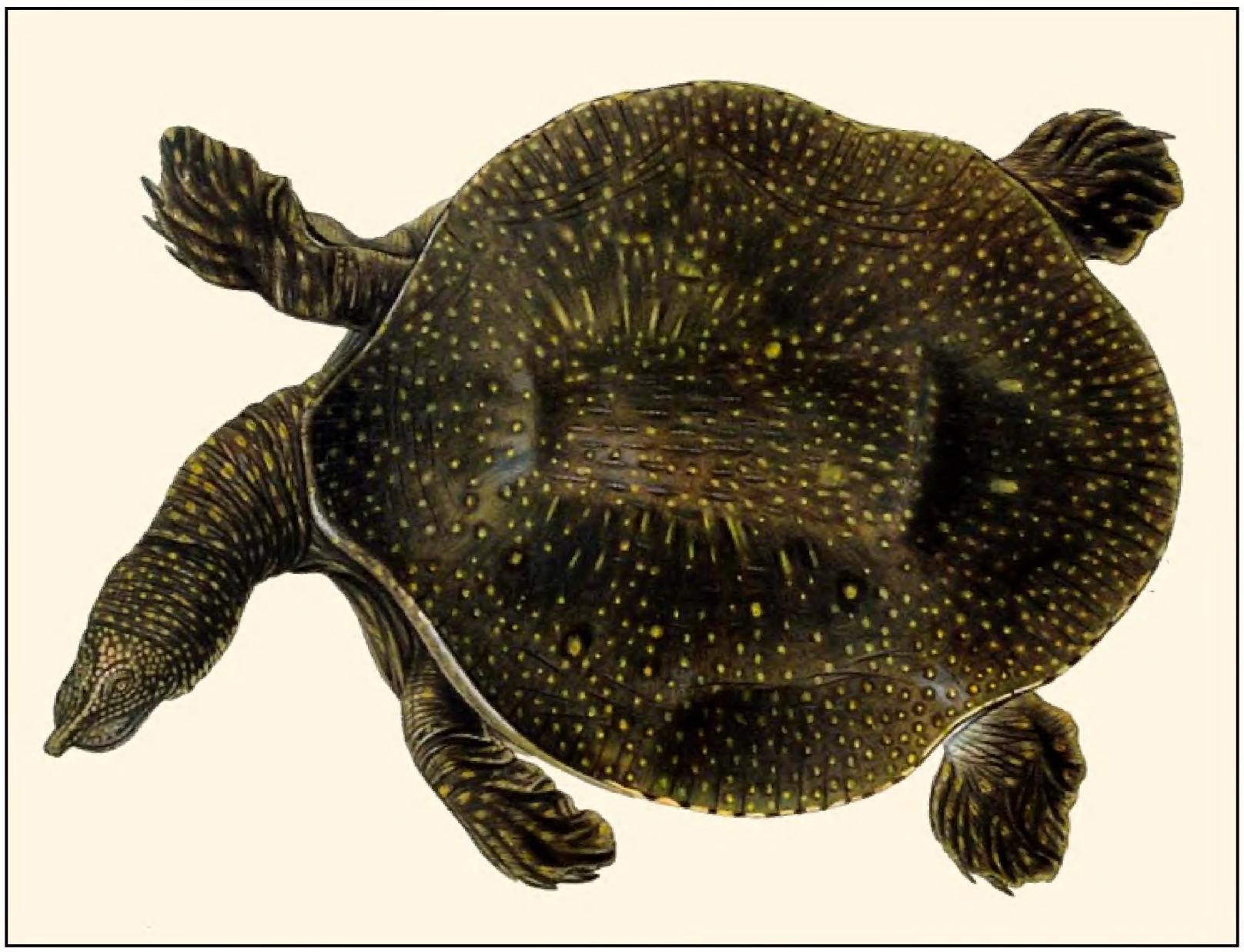

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Toad Stools: Part Three

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Prologue: This continues my account of an impromptu study of the rococo toad, *Rhinella schneideri*, undertaken during my nearly annual trip to the Chaco of Paraguay and yearly planning for "Proyecto Tagua," the conservation program for the endangered Chacoan peccary, *Catagonus wagneri*. What follows is taken from my field notes written in November of 2016 during and following a ten-day-long stay.

I know you are eager to learn the outcome of attempting to bring dried rococo toad stool samples back from the Chaco of Paraguay to my university. As I look back, I thought I had a greater than fifty percent chance of getting them home—which looking at it another way is having a fifty percent chance of failing. You have to know that when I prepare for field work and equally so when I return, I am a very organized and detailed packer trying to anticipate my field material and supply needs. If I don't bring it with me the chances are that I won't have a chance of finding it in Paraguay, even in the capital city. I try to bring extra supplies to leave at the *Proyecto*, for my future use but most importantly for their ongoing research needs. I have a detailed list of needs developed from each trip and work from this with each new trip. In short there is almost always a basic supply of what might be needed in a typical field excursion whether it is in the austral spring or alternatively, winter.

Coming home I always have less than going and arrange my luggage so that I can put an empty bag into another packed bag downsizing so to speak. This has worked consistently for me and for the *Proyecto*, which benefits from research supplies that are difficult to obtain or rarely available as well as costly. The rococo toad stool study identified a need for a small drying oven so on my list for next time is to search for the smallest possible oven or something that could be modified or serve as an alternative. On the same list are a case lot of clear plastic-capped vials of suitable size to accommodate toad stool samples. Given the measurements of the samples and the need to try to keep them intact, longer vials are needed. These have been ordered from a supplier in Ohio and will make the trip south next time.

I only take one carry-on, a rolling soft sided duffle that was purchased at K-Mart many years ago. I like it because the entire length and width of the bag can be opened when it is laid flat. It has two mid-sized pockets on this flap which allows easy access to needed items en route without opening the entire bag. Additionally on the long sides are two expandable zippered pockets where larger or bulkier non-breakable items can be stored while traveling. These are of sufficient size to allow me to bring a change of clothing. The main compartment holds about everything of value to me for the trip. Camera, flashlights, rechargeable batteries, snakebite kit, assorted medication, the ever present field guide, disinfectant wipes, snacks and hard candy, power cords and whatever delicate or irreplaceable items I might need en route or on arrival.

As an example of how well I pack let me share an experience at a TSA security check at O'Hare International. Please be assured we are ever protected. This is not an aberration for me, it happens roughly two out of three times I travel internationally for field work. I used to think it was my appearance. You know, full beard, casual clothes, headed for a destination few choose to go to via an intermediate stop that could be described as the gateway to Latin America. Add a little color due to midwestern summer sun and impatience with the length of the process and I probably get what I deserve. My wife says I could go anywhere and find a way to bring back almost anything and she can verify I am up to the challenge. This is equally so heading out. It used to be the dreaded call out "Man on four!" that got my full attention, as well as all those around me. Now the TSA is much more civil and sophisticated and it has become "Is this your bag?" sometimes with an attitude, more often and most recently, without. Off the screening belt and to the nearby testing station. I don't immediately get the wipe down testing for explosives and drugs. I go right to "may I open the bag Sir?" Inquiring hands then attempt to unpack all of my traveling treasures, which I have diligently and carefully arranged in their proper place at the right level. At first it is somewhat genteel but then becomes labor intensive and the level of exploring becomes more assertive. This could be viewed as an archaeological dig in my carry-on. In the end, the bag with its partial contents is sometimes re-sent through screening while I and an assorted pile of my traveling necessities stand by at the exploration site. With a second pass through the screening it is not uncommon for the agent to attempt to pile everything that has been removed into the bag in what is clearly a disorganized and haphazard manner without any attention to detail. Attempts at zipping the bag often fail and I am allowed to walk off with a partially zipped disaster. I am then off to a flat area somewhere adjacent to security screening to try to reassemble my travel necessities, spending whatever time it took to get organized. At first, I was annoyed by the entire process, actually distressed. Later I found it interesting and just assumed it was my fate to be "the one" to get the going over. It was not until one kindly agent said to me during one of these TSA explorations "you know, you pack too well and we can't see through everything you bring. If you packed less you'd get through here a lot faster." Point well taken. You ask, have I changed the way I do things, and the answer is no, not one bit. I note that the latest screening equipment at O'Hare appears to be able to scan whatever I attempt to take with me without the need to unpack the bag. The explosives wipe down? Oh sometimes that still takes place and I am always grateful when I see it done.

Back to bringing toad stools home. I packed the samples in heavy weight Ziploc bags in such a way as to keep the vials from moving in the bag. I want to try to get them home intact to

undertake more refined measurements of weight, length and width as well as contents. When these bags had been packed I placed them in a final larger plastic bag for enclosure in my checked luggage. Now comes the interesting part. I placed this bag inside a bag of soiled clothes, those that I did not have time or the ability to wash in the field before heading home. Think of these bags within bags as one of those wonderful Russian toys, a matryoshka, where there seemingly is a never ending brightly colored figure inside the figure you open until at last you come to the final smiling dancing girl or mustached political character. I have no idea why I do this and no it is definitely not an attempt to circumvent the security system. Drug and bomb sniffing dogs can sniff through anything. It is probably just one of those things I did once and have not changed since because it seemed to work. I always think that the bag of clothes provides a layer of extra cushioning for the samples and doesn't require additional packing material to be hauled home. Also, and secretly, I have always thought that packing something in with dirty clothes was, well, in itself a deterrent to inspection. Who knows?

Arrival in Chicago at the end of November or early December is problematic physically and physiologically. Most trips I've been up for the better part of 24 to 30 hours with little sleep and have just left austral spring where the sun shines, the humidity comforts you and the daytime temperatures are mid-80s in Asunción, and even higher in the Chaco. I can never drink enough water in route to satisfy my needs and I never have the right, as in correct, clothing available on arrival to shield me from the midwestern elements. It is almost like Mother Nature is paying me back for having a second spring experience in the same year by traveling to Paraguay after ours has passed and theirs has just begun.

I arrived home from Paraguay to a cold blustery evening, worn out from my marathon flight from the capital city of Asunción. It is more or less eight hours from there to an intermediate stop in Panama City, Panama. There is a layover of from two to four hours and then an six-hour flight to Chicago. This is the most direct route and only is possible because COPA, the national airlines of Panama, flies out of Chicago as well as Asunción. The usual long walk from the gate to and through Immigration and then to baggage, finally to find luggage on the ever-circling belt, hoist it off and head to Custom's check and out onto the street. The whole time one knows one is under video surveillance from when you stumble off the plane and fumble your way along the arrival corridor with its multiple turns and grade changes. You know the observers work with an intellectual check list of behavioral traits that might tag one suspicious and worthy of further investigation. Bearded, stumbling, older males looking for hidden cameras or on the lookout for sniffer dogs might bear closer scrutiny. I figured it might be fitting if after all my efforts, the stool samples from the ***sapos*** were sniffed out by some beagle or beagle-terrier cross bellowing with joy at the new-found scent. I grabbed my luggage and was ignored by the dog. On one hand I was relieved that my samples, ever so carefully packed with dirty clothes, did not even cause the pup to give a sniff or pause in my direction and I must admit a part of me was a bit disappointed. Welcome home was the greeting as I handed in my paperwork.

For those of you who may be concerned about transporting amphibian feces as part of one's personal belongings, please don't be. I would never risk violating a regulation or ignore existing health regulations for the sake of scientific inquiry, even ***sapo*** inquiry. I knew that the dried irradiated fecal samples were for all intents and purposes sterile. They were odorless to the non-beagle nose and rock hard, having received more than enough sun exposure to thoroughly dehydrate as well as terminate any unseen organism contained therein. No endangered species, no live wildlife, no hazardous material, no illegal contraband, just thirty-eight vials of ***sapo*** poop.

Unlocking, let alone unpacking waits until the day after arrival and some of the fatigue from travel as well as joy at being home keep me from dwelling on the contents of my luggage. After a full night's sleep, morning coffee and conversation, I dare to put the key in the pre-approved TSA locks and zip open my bags, including the dirty clothes bag with its treasures. The first clue I had that all was well was when I opened the bag and did not find a carefully worded note from the TSA saying they had opened and inspected my bag to insure I along with the rest of the world remained safe. This protection for you and me, is required by law, and as stated, is TSA's responsibility. You know, the red bold-lettered "**Notification of Baggage Inspection**." Sure enough, like the Russian dolls, inside the bag, inside the inside of the bag, were the carefully wrapped stool samples, no worse for the several-thousand-mile voyage. I was, putting it mildly, more than pleased to have them safely in my hands.

The story doesn't end here but then that is a narrative for another day.

Acknowledgments

Juan Manuel Campos, the Director of the Chaco Center for Conservation and Research, Ivan Benitez and Victor Robles of the scientific staff there, each shared in the experience and contributed in various ways. Jeff Holland was a welcome travel companion and colleague. The Scott Neotropical Foundation generously supports efforts at the Center and continues to encourage Chaco conservation and natural history research. Finally, to my colleague and friend, Kurt Benirschke, MD, who introduced me to the Chacoan peccary and our need to protect it. I am forever grateful.

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The Parasites of Worm Lizards (Amphisbaenia)

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Abstract

Amphisbaenians live underground, making many aspects of their natural history difficult to observe. As a result, relatively few parasitological surveys of these reptiles have been conducted. Nonetheless, a wide range of organisms (viruses, microorganisms, flukes, tapeworms, roundworms, tongue worms, and mites) have been found infecting at least 27 worm lizard species. Here, I summarize the diversity of parasites reported from worm lizards globally and provide checklists with host species, geographic localities, infection sites within the hosts, and parasite prevalence and intensity information. These checklists provide a foundation for future work.

Introduction

The fauna that inhabits underground environments has been the subject of relatively little study. Most research has focused on soil invertebrates, while fossorial vertebrates have been largely overlooked (Copely, 2000; Measey, 2006, Böhm et al., 2013). Among the least known of the subterranean dwelling vertebrates are the amphisbaenians or worm lizards (Reptilia: Squamata: Amphisbaenia), a group of about 190 highly specialized reptiles adapted to life in the soil (Uetz, 2002; Gans, 2005; Colli et al., 2016)[1]. Worm lizards occur primarily in southern Europe, northern Africa, Asia Minor, and South America, mostly in tropical environments, but also in more arid habitats. Because amphisbaenians live underground, many aspects of their natural history are difficult to observe and there is very little information on the basic biology and ecological requirements of most species (Gans, 1978; Böhm et al., 2013; Meiri and Chapple, 2016). Effective conservation planning requires an understanding of factors, including diseases and parasites, that may affect individual fitness, reproductive success, and survival, as well as overall population structure. Although several worm lizards may be of conservation concern (Böhm et al., 2013; Colli et al., 2016), relatively few detailed parasitological surveys of these reptiles have been undertaken. The available reports are scattered throughout the literature across disciplines and in at least six different languages. To date, there has been no comprehensive parasite-host checklist available to aid investigators. To begin to address this concern, this present work summarizes the diversity of parasites reported from amphisbaenians globally and provides checklists with geographic localities, infection sites within the hosts (anatomical habitat), and prevalence and intensity information.

Parasite-Host Checklist

Twenty-seven species of worm lizards (four families) from 15 countries (five continents) harbor at least 65 different parasite species (two viruses, 19 microorganisms, six flukes, seven tapeworms, 27 roundworms, three tongue worms, and one mite). Beginning on the following page I list these parasites taxonomically, with family and species names presented alphabetically for convenience sake. Nomenclature is presented to the lowest possible taxonomic classification based on the source literature, with only minimal attempts made to update the complex nomenclature of parasite organisms and to correct errors in previous compilations. Amphisbaenian nomenclature follows Gans (2005). Some parasite species occur in multiple hosts, including other reptiles not listed here. Geographic locations are taken from the literature and are presented at the state/province and country scale. Both the hosts and the parasites likely occur in additional localities. I list anatomical habitats as reported and include information on parasite prevalence (% of individuals examined that were found to be infected; n = number of infected individuals) and infection intensity (number of parasites per host; often, mean with range and standard deviation), when that information is available in the original source. It must be noted, however, that precision in measuring these rates and levels is related closely to sample size and as such any comparisons between studies should be approached cautiously. Comments place the records in context and clarify interesting details of the reports. Source references are listed for each record. Unfortunately, the available information for many species remains fragmentary and incomplete.

This compilation of the literature can be characterized as exhaustive, but likely not complete. I was unable to review three references included in Gans's (2005) bibliography while preparing this manuscript; Masi Pallarés and Usher (1973) and Masi Pallarés et al. (1973, 1976) apparently contain information on parasites of *Amphisbaena alba*, *A. camura*, and *Leposternon* sp. that may expand the lists presented here. In addition, given the obscure nature of many sources, it is quite possible that a small number of records may have escaped notice. I would appreciate learning of any such reports.

1. The current number of described species likely underestimates the true diversity of worm lizards, with both undescribed and cryptic species remaining to be discovered. A combination of very small geographic ranges, a lack of sampling effort, and various other factors preclude defensible estimates of actual species diversity (Colli et al., 2016). Gans (2005) provides the most recent compilation of work on these taxa.

- - - - - Viruses - - - - -

Adenoviridae

Adenovirus: AmAdV-1 Szirovicza et al., 2016
Host: *Blanus cinereus*
Geographic location: Chafarinas Islands, Mediterranean Sea, North Africa
Anatomical habitat: cloacal swab
Prevalence: 50% (n = 9)
Comments: All infected individuals "appeared to be healthy, showing no clinical signs or behavioral anomalies" (Szirovicza et al., 2016).
Reference: Szirovicza et al. (2016)

Parvoviridae

Dependovirus sp. Pénzes and Benkő, 2014
Host: *Trogonophis wiegmanni*
Geographic location: "wild-caught somewhere in North Africa"
Anatomical habitat: Small pieces from the internal organs (kidney, liver, lungs, and intestine) were pooled and homogenized.
Comments: Pénzes and Benkő (2014) were the first to report a virus from a worm lizard and the first to describe the occurrence of a parvovirus in a reptilian host that could be demonstrated without the detection of any helper (i.e., large DNA) virus. The host "died unexpectedly without showing alarming disease signs."
Reference: Pénzes and Benkő (2014)

- - - - - Amoebozoa - - - - -

Hartmannellidae

Unidentified hartmannellid amoeba
Host: *Rhineura floridana*
Geographic location: Florida, USA
Prevalence: 50% (n = 2)
References: Telford (1961), Telford and Bursey (2003)

- - - - - Apicomplexa - - - - -

Eimeriidae

Choleoeimeria amphisbaenae Lainson, 2003
Host: *Amphisbaena alba*
Geographic location: Pará, Brazil
Anatomical habitat: epithelial cells of the gall bladder
Prevalence: 50% (n = 5)
Comments: Lainson (2003) noted that all infected hosts appeared healthy, but their gall bladders suffered extensive damage involving the entirety of the epithelium.
Reference: Lainson (2003)

Choleoeimeria wiegmanniana Megía-Palma et al., 2015
Host: *Trogonophis wiegmanni*
Geographic location: Chafarinas Islands, Mediterranean Sea, North Africa
Anatomical habitat: faecal samples
Reference: Megía-Palma et al. (2015)

Choleoeimeria zarudnyi (Alyousif and Al-Shawa, 2003)
Host: *Diplometopon zarudnyi*
Geographic location: Riyadh, Saudi Arabia
Anatomical habitat: gall bladder; oocysts found in intestine and faeces
Prevalence: 17% (n = 5)
References: Alyousif and Al-Shawa (2003), Abdel-Baki et al. (2013)

Eimeria amphisbaeniarum Huntington et al., 1996
Host: *Amphisbaena manni*
Geographic location: Barahona, Dominican Republic
Anatomical habitat: oocysts found in faeces
Prevalence: 50% (n = 1)
Reference: Huntington et al. (1996)

Eimeria witcheri Huntington et al., 1996
Host: *Amphisbaena manni*
Geographic location: Barahona, Dominican Republic
Anatomical habitat: oocysts found in faeces
Prevalence: 50% (n = 1)
Reference: Huntington et al. (1996)

Isopora capanemaensis Lainson, 2003
Host: *Amphisbaena alba*
Geographic location: Pará, Brazil
Anatomical habitat: epithelial cells of the ileum
Prevalence: 60% (n = 6)
Comments: Five of 6 individuals infected with *I. campanemaensis* were also affected with *Choleoeimeria amphisbaenae*. Lainson (2003) noted that although the infections may be intense, the hosts showed no outward signs of effects.
References: Lainson (2003), Abdel-Baki and Al-Quraishy (2011)

Isopora diplometoponi Alyousif and Al-Shawa, 1998
Host: *Diplometopon zarundnyi*
Geographic location: eastern Saudi Arabia
References: Alyousif and Al-Shawa (1998), Abdel-Baki and Al-Quraishy (2011)

Isopora riyadhensis Abdel-Baki and Al-Quraishy, 2011
Host: *Diplometopon zarundnyi*
Geographic location: Riyadh, Saudi Arabia
Anatomical habitat: epithelial cells of posterior region of small intestine
Prevalence: 26.6% (n = 8)
Reference: Abdel-Baki and Al-Quraishy (2011)

Isopora wiegmanniana Megía-Palma et al., 2016
Host: *Trogonophis wiegmanni*
Geographic location: Chafarinas Islands, Mediterranean Sea, North Africa
Anatomical habitats: blood samples, faecal samples
Prevalence: 52.1% (n = 37)
Reference: Megía-Palma et al. (2016)

Haemogregarinidae

Hepatozoon amphisbaenae (Pessôa, 1968)
Host: *Amphisbaena alba*
Geographic locations: Brazil, Venezuela
Anatomical habitat: blood
Comments: Lainson (2003) felt the organism originally identified as *Haemogregarina amphisbaenae* probably did not belong to the genus *Haemogregarina*, apparently unaware that Smith (1996) had already transferred it to the genus *Hepatozoon*.
References: Pessôa (1968), Telford (1984), Levine (1988), Smith (1996)

Unidentified haemogregarine
Host: *Trogonophis wiegmanni*
Geographic location: Chafarinas Islands, Mediterranean Sea, North Africa
Anatomical habitat: blood
Reference: Rueda et al. (2010)

Unknown Family

Unidentified coccidian cyst
Hosts: *Amphisbaena alba, A. vermicularis*
Geographic location: Bahia, Brazil
Anatomical habitat: kidney
Reference: Valverde et al. (2005)

Unidentified coccidian
Host: *Chirindia mpwapwaensis*
Geographic location: former Tanganyika Territory, Southern Province, Tanzania
Anatomical habitat: muscle in distal half of hemipenis
Reference: Rosenberg (1967)

Unidentified multisporocystic oocyst
Host: *Amphisbaena alba*
Geographic location: Pará, Brazil
Anatomical habitat: faecal sample
Comments: Lainson (2005) suspected this organism to be merely passing through the intestine of the lizard within some invertebrate host that the lizard had consumed.
Reference: Lainson (2003)

Globidium-like cyst
Host: *Amphisbaena alba*
Geographic location: Pará, Brazil
Anatomical habitat: *lamina propria* of ileum
Comments: The host was concomitantly infected with *Choleoeimeria amphisbaenae* and *Isopora campanemaensis*.
Reference: Lainson (2003)

Unidentified multinucleate, cyst-like bodies
Host: *Amphisbaena alba*
Geographic location: Pará, Brazil
Anatomical habitat: kidney smear
Comments: Lainson (2003) was uncertain whether the cyst-like bodies were protozal or fungal, but noted growth of the parasites produced relatively large cyst-like bodies with a large central vacuole.
Reference: Lainson (2003)

- - - - - Ciliophora - - - - -

Nyctotheridae

Nyctotherus amphisbaenae Carini, 1939
Host: *Amphisbaena vermicularis*
Geographic location: Brazil
Anatomical habitat: cloaca
Reference: Carini (1939)

Nyctotherus sokoloffi Schouten, 1940
Host: *Amphisbaena albocingulata*
Geographic location: City of Asunción, Paraguay
Anatomical habitat: cloaca
Reference: Schouten (1940)

- - - - - Trematoda - - - - -

Dicrocoeliidae

Platynosomum sp. Looss, 1907
Host: *Amphisbaena ridleyi*
Geographic location: Pernambuco, Brazil
Anatomical habitats: gall bladder, bile duct, small intestine
Prevalence: 36%
Intensity: mean = 13.8
References: Ramalho et al. (2009), Ávila and Silva (2010)

Mesoceliidae

Mesocoelium monas (Rudolphi, 1819)
Hosts: *Amphisbaena ridleyi*, *Amphisbaena* sp., *Leposternon microcephalum*
Geographic locations: Pernambuco and Rio de Janeiro/Guanabara, Brazil
Anatomical habitat: small intestine
Prevalence: 44%
Intensity: mean = 2.8
Comments: Prevalence and intensity levels refer to infections in *A. ridleyi* and are taken from Ramalho et al. (2009)
References: Rudolphi (1819), Hughes et al. (1941b), Freitas (1963), Travassos et al. (1969), Ramalho et al. (2009), Ávila and Silva (2010), Fernandes and Kohn (2014)

Plagiorchidae

Haplometroides buccicola Odhner, 1911
Host: *Amphisbaena alba*
References: Ruiz and Perez (1959), Fernandes and Kohn (2014)

Pneumotrema travassosi Bhalerao, 1937
Host: *Amphisbaena alba*
Geographic location: Brazil
Anatomical habitat: lung
References: Bhalerao (1937), Hughes et al. (1941b), Ávila and Silva (2010), Fernandes and Kohn (2014)

Proterodiplostomatidae

Pseudoneodiplostomum bifurcatum (Wedl 1861) Dubois 1948
Host: *Amphisbaena alba*
Anatomical habitat: lung
References: Diesing (1850)

Unknown Family

Ligula repians – species incertae sedis
Host: *Amphisbaena alba*
Anatomical habitat: abdomen
Reference: Diesing (1850)

- - - - - Cestoda - - - - -

Diphyllobothriidae

Diphyllobothrium erinacei (Rudolphi, 1819)
Host: *Amphisbaena alba*
Reference: Hughes et al. (1941a)

Linstowiidae

Oochoristica ameivae (Beddard, 1914)
Host: *Amphisbaena alba*
Reference: Travassos (1965)

Oochoristica amphisbaenae (Rudolphi, 1819)
Host: *Amphisbaena alba*
Geographic location: Brazil
Reference: Hughes et al. (1941a)

Oochoristica parvula (Stunkard, 1938)
Host: *Bipes biporus*
Geographic location: Baja California del Sur, Mexico
Anatomical habitat: digestive tract
Prevalence: 50% (n = 149)
Intensity: mean = 49.7 ± 56.2 (3 – 112)
Reference: Goldberg and Bursey (2012)

Oochoristica travassosi Rego and Ibañez, 1965
Host: *Amphisbaena ridleyi*
Geographic location: Pernambuco, Brazil
Anatomical habitat: small intestine
Prevalence: 48%
Intensity: mean = 2.2
References: Ramalho et al. (2009), Ávila and Silva (2010)

Semenoviella amphisbaenae (Rudolphi, 1819)
Hosts: *Amphisbaena alba, A. fuliginosa*
Geographic locations: Minas Gerais, Pará, and São Paulo, Brazil
Anatomical habitat: small intestine
Prevalence: n = 26
Comments: Prevalence rate taken from Quirino et al. (2018).
References: Diesing (1850), Rego (1967), Ávila and Silva (2010), Quirino et al. (2018)

Mesocestoididae

Cisticercoideum sp. Parona, 1901
Host: *Amphisbaena* sp.
Geographic location: Brazil
Reference: Hughes et al. (1941a)

- - - - - Nematoda - - - - -

Cosmocercidae

Aplectana albae Adamson and Baccam, 1988
Hosts: *Amphisbaena alba, A. ridleyi*
Geographic locations: Pará and Pernambuco, Brazil
Anatomical habitats: posterior intestine, small intestine, large intestine
Prevalence: 96%
Intensity: mean = 143.4
Comments: Prevalence and intensity levels refer to infestations in *A. ridleyi* and are taken from Ramalho et al. (2009).
References: Adamson and Baccam (1988), Vicente et al. (1993), Ramalho et al. (2009) Ávila and Silva (2010)

Aplectana nordestina De Amorim et al., 2017
Host: *Leposternon polystegum*
Geographic location: Ceará, Brazil
Anatomical habitat: large instestine
Reference: De Amorim et al. (2017)

Aplectana raillieti Travassos, 1925
Hosts: *Amphisbaena alba, Amphisbaena* sp.
Geographic location: Rio de Janeiro, Brazil
Anatomical habitat: intestine
Comments: The host was originally cited as *A. fusca*.
References: Travassos (1931), Baker (1980, 1981, 1987), Vicente et al. (1993), Ávila and Silva (2010)

Aplectana rysavyi Barus and Coy-Otero, 1969
Host: *Cadea palirostrata*
Geographic location: Santa Fe-Isla de Pinos, Cuba
References: Barus and Coy-Otero (1969), Baker (1987)

Aplectana tucumanensis Ramallo et al., 2008
Host: *Amphisbaena bolivica*
Geographic location: Tucamán, Argentina
Anatomical habitat: large intestine
Intensity: 50
References: Ramallo et al. (2008), Ávila and Silva (2010)

Aplectana unguiculata (Rudolphi, 1819)
Hosts: *Amphisbaena alba*, *Amphisbaena vermicularis*, *Amphisbaena* sp., *Anops kingi*, *Leposternon microcephalum*
Geographic location: Bahia, Brazil
Anatomical habitat: intestine
Comments: Baker (1980, 1981) and Dyer et al. (1999) considered *A. unguiculata* to be a *species dubia* and Baker (1987) referred to it as a *species inquerienda.* It is likely conspecific with *Maracaya pusilla* (Miranda, 1924).
References: Diesing (1850), Miranda (1924), Travassos (1931), Baker (1987), Vicente et al. (1993), Ávila and Silva (2010)

Aplectana sp. Railliet & Henry, 1916
Host: Blanus strauchi
Geographic locations: Antalya, Denizli, Hatay and Muğla, Turkey
Anatomical habitats: small intestine, large intestine
Prevalence: 64.7% (n = 11)
Intensity: mean = 24.3 (±19.8)
Reference: Düşen et al. (2010)

Blanusia pseudorhabditis Zapatero et al., 1990
Host: Blanus cinereus
Geographic location: Madrid, Spain
Anatomical habitat: small intestine
Prevalence: 85.37% (35)
Intensity: mean = 14.31
Reference: Zapatero et al. (1990)

Cosmocerca rara Freitas and Vicente, 1966
Host: *Leposternon microcephalum*
Geographic location: Rio de Janeiro, Brazil
Anatomical habitat: large intestine
References: Freitas and Vicente (1966), Vicente et al. (1993), Ávila and Silva (2010)

Maracaya belemensis Adamson and Baccam, 1988
Host: *Amphisbaena alba*
Geographic location: Pará, Brazil
Anatomical habitat: posterior intestine
References: Adamson and Baccam (1988), Vicente et al. (1993), Ávila and Silva (2010)

Maracaya graciai Díaz-Ungría, 1965
Hosts: *Amphisbaena alba, Amphisbaena* sp.
Geographic location: Aragua, Venezuela
Anatomical habitat: intestine
References: Diaz-Ungria (1965), Baker (1987), Adamson and Baccam (1988), Ávila and Silva (2010)

Maracaya pusilla (Miranda, 1924)
Hosts: *Amphisbaena alba*, *A. bakeri*, *Amphisbaena* sp.
Geographic locations: Bahia, Brazil; San Germán, Puerto Rico
Anatomical habitats: intestine, small intestine
Intensity: > 47
Comments: Adamson and Baccam (1988) transferred this species from *Aplectana* to *Maracaya* and moved the entire genus *Maracaya* from Atractidae to Cosmocercidae. Intensity information refers to *A. bakeri* and is taken from Dyer et al. (1999).
References: Miranda (1924), Travassos (1931), Baker (1980, 1987), Adamson and Baccam (1988), Vicente et al. (1993), Dyer et al. (1999), Ávila and Silva (2010)

Paradollfusnema amphisbaenia (Baker, 1981)
Hosts: *Leposternon microcephalum*, *L. polystegum*, *L. wuchereri*
Geographic locations: Ceará, Minas Gerais, and Pernambuco, Brazil
Anatomical habitats: large intestine, stomach, and small intestine
Prevalence: *L. wuchereri*: large intestine: 100% (n = 41), small intestine: 7.3%, stomach: 2%
Intensity: *L. wuchereri*: mean = 116.2 ± 16.6 (range = 1 – 457); *L. polystegum*: 4
Comments: Prevalence and intensity levels for *L. wuchereri* taken from Filogonio et al. (2013). Intensity for *L. polystegum* taken from De Amorim et al. (2014). Intensity of infection was positively correlated with body size of both male and female amphisbaenians (Filogonio et al., 2013). Presence of the nematode did not affect fat body mass but did "induce inflammatory infiltrations in the small intestine, indicating that the parasites might injure the host's organs."
References: Baker (1981, 1987), Vicente et al. (1993), Ávila and Silva (2010), Filogonio et al. (2013), De Amorim et al. (2014)

Paradollfusnema telfordi Bursey, 2002
Host: *Rhineura floridana*
Geographic location: Florida, USA
Anatomical habitat: large intestine
Prevalence: 50% (n = 2)
Intensity: 46, 82, and 86
Comments: Prevalence information is taken from Telford (1961). Intensity information is taken from Bursey (2002). In this latter case, nematodes were removed from three host animals, but amphisbaenian sample size was not provided. Thus, prevalence cannot be determined for that study.
References: Telford (1961), Bursey (2002), Telford and Bursey (2003)

Pharyngodonidae

Alaeuris sp. Tharpar, 1925 or *Paralaeuris* sp. Cuckler, 1938
Host: *Amphisbaena alba*
Geographic location: Venezuela
Comments: Autoinfection, the ability to cycle within the host, occurs in some members of the nematode family Pharyngodonidae. Adamson (1988) describes a female nematode that contained larvae developing *in utero* that were lying free and not surrounded by an egg shell suggesting an autoinfective lifecycle. He did not name the organism because only the single specimen was available for study, but believed it to belong to one of the two listed genera.
Reference: Adamson (1988)

Parapharyngodon cubensis Barus and Coy-Otero, 1969
Host: *Amphisbaena cubana*
Geographic location: Cuba
Anatomical habitat: intestine
References: Baker (1987), Falk and Perkins (2013)

Parapharyngodon lamothei Jiménez et al., 2008
Host: *Bipes canaliculatus*
Geographic location: Guerrero, Mexico
Anatomical habitat: posterior end of intestine
Prevalence: 100% (n = 3)
References: Jiménez et al. (2008), Paredes-León et al. (2008)

Parapharyngodon maestro Jiménez et al., 2008
Host: *Bipes tridactylus*
Geographic location: Guerrero, Mexico
Anatomical habitat: posterior end of intestine
Prevalence: 80%
References: Jiménez et al. (2008), Paredes-León et al. (2008)

Parapharyngodon micipsae (Seurat, 1917)
Host: Blanus strauchi
Geographic location: Hatay, Turkey
Anatomical habitat: intestine
Prevalence: 33.3% (n = 5)
Intensity: mean = 2.2 (range = 1– 4)
Comments: Eight worm lizards were coinfected with thelastomatoid nematodes.
Reference: Yildirimhan et al., 2009

Parapharyngodon sp. Chatterji, 1933
Host: *Bipes biporus, Diplometopon zarudnyi*
Geographic location: Baja California del Sur, Mexico
Anatomical habitat: digestive tract
Prevalence: *B. biporus*: 83% (n = 9); *D. zarudnyi*: 20% (n = 1)
Intensity: *B. biporus*: mean = 1.8 ± 0.5 (1 – 2); *D. zarudnyi*: 2
Comments: Prevalence and intensity for *B. biporus* taken from Goldberg and Bursey (2012). Information for *D. zarudnyi* taken from

Kardousha (2002).
References: Kardousha (2002), Goldberg and Bursey (2012)

Pharyngodon spinicauda (Dujardin, 1845)
Host: *Blanus strauchi*
Geographic locations: Antalya, Denizli, Hatay and Muğla, Turkey
Anatomical habitat: large intestine
Prevalence: 52.94% (n = 9)
Intensity: mean = 2.2 (± 1.6)
Reference: Düşen et al. (2010)

Thelandros alvarengai (Freitas, 1957)
Host: *Amphisbaena ridleyi*
Geographic location: Pernambuco, Brazil
Anatomical habitat: large intestine
Prevalence: 4%
Intensity: mean = 1.0
References: Ramalho et al. (2009), Ávila and Silva (2010)

Physalopteridae

Physaloptera retusa Rudolphi, 1819
Host: *Amphisbaenia alba*
Anatomical habitats: stomach, intestine
References: Molin (1860), Baker (1987), Ávila and Silva (2010)

Trichuridae

Sclerotrichum echinatum (Rudolphi, 1819)
Host: *Bipes* sp.
Reference: Diesing (1850)

Unknown Family

Unidentified Thelastomatoid nematode
Host: *Blanus strauchi*
Geographic location: Hatay, Turkey
Anatomical habitat: intestine
Prevalence: 93.33% (n = 14)
Intensity: mean = 16.57 (range = 1 – 62)
Comments: Eight worm lizards were coinfected with *Parapharyngodon micipsae*.
Reference: Yildirimhan et al., 2009

Unidentified nematodes
Host: *Trogonophis wiegmanni*
Geographic location: Chafarina Islands, Mediterranean Sea, North Africa
Anatomical habitat: intestine
Reference: Rueda et al. (2010)

Unidentified nematodes
Host: *Ancylocranium ionidesi*
Geographic location: former Tanganyika Territory, Southern Province, Tanzania
Anatomical habitat: intestine
Reference: Loveridge (1955)

- - - - - Pentastomida - - - - -

Raillietiellidae

Raillietiella furcocercum (Diesing, 1836)
Host: *Amphisbaena alba*
Geographic location: Captive specimen at London Zoological Gardens (uncertain origin but believed to be from Mato Grosso, Brazil)
Anatomical habitats: lungs, abdominal cavity and mesentery
Comments: The original descriptions of this parasite by Diesing (1835, 1850) were based on immature forms. Hett (1924) suggested *Raillietiella* specimens taken from *A. alba* actually represent *R. gigliolii* Hett, 1924.
References: Diesing (1836, 1850), Dujardin (1845), Shipley (1898), Giglioli (1923), Hett (1924), Brygoo (1963), Poore (2012), Christoffersen and de Assis (2013)

Raillietiella gigliolii Hett, 1924
Hosts: *Amphisbaena alba, A. vermicularis, Amphisbaena* sp.
Geographic locations: Ceará and Paraíba, Brazil; Ortinola District, Trinidad, West Indies
Anatomical habitat: respiratory tract
Prevalence: *A. alba*: 86% (n = 12); *A. alba*: 33.3% (n = 3); *A. alba*: 55.5% (n = 5); *A. vermicularis*: 50% (n = 6)

Intensity: *A. alba*: 3.0 ± 0.0; *A. alba*: 5.0 ± 2.53, range 1 – 13; *A. vermicularis*: 5.3 ± 2.1, range 1 – 14

Comments: Intensity and prevalence in *A. alba* taken from Winch and Riley (1985), Almeida et al. (2006), and Almeida et al. (2009). Intensity and prevalence in *A. vermicularis* taken from Almeida et al. (2009). The pentastomid oral and copulatory apparatus are illustrated in Rego (1983) and Ali et al. (1984). Details of the cephalothorax are illustrated in Almeida et al. (2006). Ali et al. (1984) describe the male pentastomid. Almeida et al. (2009) observed that infected lung tissues were "intact and without lesions, scars, or traces of hemorrhaging," suggesting pentastomids probably do not cause significant pathologies in these hosts.

References: Giglioli (1923), Hett (1924), Fain (1961), Nicoli (1963), Everard (1975), Rego (1983), Ali et al. (1984), Riley and Winch (1984), Winch and Riley (1985), Riley (1986), Almeida et al. (2006), Almeida et al. (2009), Poore (2012), Christoffersen and de Assis (2013)

Raillietiella schoutedeni (Fain, 1960)

Host: *Monopeltis schoutedeni*

Geographic location: Mai-Ndombe/Bandundu, Democratic Republic of the Congo

Anatomical habitat: lung

References: Fain (1960, 1961), Nicoli (1963), Poore (2012), Christoffersen and de Assis (2013)

- - - - - Arthropoda: Acarina - - - - -

Heterozerconidae

Amheterozercon amphisbaenae (Flechtmann and Johnston, 1990)

Host: *Amphisbaena alba*

Geographic location: São Paulo, Brazil

Anatomical habitat: ectoparasites on the head

Comments: Fajfer (2012) characterized these mites as temporary ectoparasites. Flechtmann and Johnston (1990), however, observed blood in the midgut diverticula suggesting more than a phoretic relationship.

References: Flechtmann and Johnston (1990), Fajher (2012)

Host-Parasite Checklist

The following checklist identifies parasites reported from each species of worm lizard. Refer to the "Parasite-Host Checklist" above for details of the reports and literature citations.

Family Amphisbaenidae

Amphisbaena alba Linnaeus, 1758
- *Choleoeimeria amphisbaenae*
- *Isopora capanemaensis*
- *Hepatozoon amphisbaenae*
- Unidentified coccidians
- *Haplometroides buccicola*
- *Pneumotrema travassosi*
- *Pseudoneodiplostomum bifurcatum*
- *Ligula repians*—species incertae sedis
- *Diphyllobothrium erinacei*
- *Oochoristica ameivae*
- *Oochoristica amphisbaenae*
- *Semenoviella amphisbaenae*
- *Aplectana albae*
- *Aplectana raillieti*
- *Aplectana unguiculata*
- *Maracaya belemensis*
- *Maracaya graciai*
- *Maracaya pusilla*
- *Alaeuris* sp. or *Paralaeuris* sp.
- *Physaloptera retusa*
- *Raillietiella furcocercum*
- *Raillietiella gigliolii*
- *Amheterozercon amphisbaenae*

Amphisbaena albocingulata Boettger, 1885
- *Nyctotherus sokoloffi*

Amphisbaena bakeri Stejneger, 1904
- *Maracaya pusilla*

Amphisbaena bolivica Martens, 1929
- *Aplectana tucumanensis*

Amphisbaena cubana Gundlach and Peters, 1878
- *Parapharyngodon cubensis*

Amphisbaena fuliginosa Linnaeus, 1758
- *Semenoviella amphisbaenae*
- *Aplectana unguiculata*

Amphisbaena manni Barbour, 1914
- *Eimeria amphisbaeniarum*
- *Eimeria witcheri*

Amphisbaena ridleyi Boulenger, 1890
- *Platynosomum* sp.
- *Mesocoelium monas*
- *Oochoristica travassosi*
- *Aplectana albae*
- *Thelandros alvarengai*

Amphisbaena vermicularis Wagler, 1824
- Unidentified coccidian
- *Nyctotherus amphisbaenae*
- *Aplectana unguiculata*
- *Raillietiella gigliolii*

Amphisbaena sp. Linné, 1758
- *Mesocoelium monas*
- *Cisticercoideum* sp.
- *Aplectana raillieti*
- *Aplectana unguiculata*
- *Maracaya graciai*
- *Maracaya pusilla*
- *Raillietiella gigliolii*

Ancylocranium ionidesi Loveridge, 1955
- Unidentified nematodes

Anops kingi Bell, 1833
Aplectana unguiculata

Blanus cinereus (Vandelli, 1979)
Adenovirus: AmAdV-1
Blanusia pseudorhabditis

Blanus strauchi (Bedriaga, 1884)
Aplectana sp.
Parapharyngodon micipsae
Pharyngodon spinicauda
Unidentified thelastomatoid nematodes

Cadea palirostrata Dickerson, 1916
Aplectana rysavyi

Chirindia mpwapwaensis (Loveridge, 1932)
Unidentified coccidian

Leposternon microcephalum Wagler, 1824
Mesocoelium monas
Aplectana unguiculata
Cosmocerca rara
Paradollfusnema amphisbaenia

Leposternon polystegum (Duméril, 1851)
Aplectana nordestina
Paradollfusnema amphisbaenia

Leposternon wuchereri (W.C.H. Peters, 1879)
Paradollfusnema amphisbaenia

Monopeltis schoutedeni Witte, 1933
Raillietiella schoutedeni

Family Bipedidae

Bipes biporus (Cope, 1894)
Oochoristica parvula
Parapharyngodon sp.

Bipes canaliculatus (Bonnaterre, 1789)
Parapharyngodon lamothei

Bipes tridactylus (Dugès, 1894)
Parapharyngodon maestro

Bipes sp. Latreille, 1802
Sclerotrichum echinatum

Family Rhineuridae

Rhineura floridana (Baird, 1858)
Unidentified amoeba
Paradollfusnema telfordi

Family Trogonophidae

Diplometopon zarudnyi Nikolski, 1907
Choleoeimeria zarudnyi
Isopora diplometoponi
Isopora riyadhensis
Parapharyngodon sp.

Trogonophis wiegmanni Kaup, 1830
Dependovirus sp.
Choleoeimeria wiegmanniana
Isopora wiegmanniana
Unidentified haemogregarines
Unidentified nematodes

Discussion

Although a wide range of parasitic organisms has been reported from various worm lizard species, only about 10 percent of these reptiles have been the subject of parasitological examinations. Much of the literature has been concerned with isolated taxonomic reports on the presence of specific species of parasites in particular host species. Of note, the type specimens for several parasites originate from amphisbaenians, but several of these have not been reported since their original descriptions. Most work has occurred in South America, primarily in Brazil. Even here, only a very small percentage of the reptile species present have been sampled for helminths and the amphisbaenians remain particularly poorly documented (Vicente et al., 1993; Ávila and Silva, 2010; Fernandes and Kohn, 2014; Quirino et al., 2018). Even less effort has been devoted to haemoparasites, coccidians, and ectoparasitic mites infecting worm lizards. Only the parasites of *Amphisbaena alba* have been comparatively well documented (Ávila and Silva, 2010; this checklist).

Information on the prevalence, intensity, and effects of parasite infections in worm lizards remains scant. A small number of surveys have reported finding no parasites. For example, Torres (2003) did not detect intestinal helminths in the *Amphisbaena prunicolor* or *A. darwinii trachura* that he examined in Brazil, and Martín et al. (2016) reported an absence of haemoparasites in *Trogonophis wiegmanni* on the Chafarinas Islands in North Africa. In other cases, parasites have been found with relatively high prevalence rates and intensities (e.g., Zapatero et al., 1990; Lainson, 2003; Ramalho et al., 2009; Goldberg and Bursey, 2012; Megía-Palma et al., 2015). The health effects of parasite infections have not been assessed in worm lizards. Anecdotal case reports, however, have noted pathological symptoms. For example, although worm lizards infected with coccidians appeared healthy and showed no outward signs of infections, their gall bladders suffered extensive damage to the epithelium (Lainson, 2003). Similarly, nematodes did not affect host fat body mass but did "induce inflammatory infiltrations in the small intestine, indicating that the parasites might injure the host's organs" (Filogonio et al., 2013). In other host species, parasite infections have resulted in various clinical symptoms and been found to influence individual fitness, life cycles, reproduction, and offspring survival rates of the hosts (e.g., Ippen and Zwart, 1996; Madsen et al., 2005; Wobeser, 2008). As a result, these organisms may play significant roles in the biological control of populations, an ecosystem function yet to be understood fully (Jørgensen, 2014).

Fossorial animals have rarely been considered in biological inventories, conservation planning, environmental impact assessments, or resource protection policies, and this unfortunately remains especially true for the worm lizards (Dacaëns et al., 2006; Colli et al., 2016; Meiri and Chapple, 2016). Avoiding "out of sight, out of mind" perspectives will be necessary if we are to understand the roles that these relatively obscure reptiles play in biological communities and terrestrial ecosystems. Such understanding will require acknowledgment of the relationships worm lizards have to other organisms; the study of parasites can reveal much about the evolution and natural history of their hosts and the environments in which they occur. As such, these

less than charismatic hosts and their parasites are part of the biological diversity that we must aim to understand and seek to conserve despite their unpopularity and an inherent "ick" factor. The present contribution reflects a first step in documenting the diversity of parasites infecting worm lizards and can hopefully serve as a starting point for those interested in addressing the shortcomings in our current knowledge.

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What You Missed at the October Meeting: Roger Carter

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I suspect that all field herpers are voyeurs to various degrees. There's a thrill in observing an animal in its natural state. It's much easier to photograph a subject in a studio. One can observe much more detail and arrange much better poses with a captive animal, but there are those among us who really enjoy coming upon an animal that is going about its business as usual. But being out in the field frequently means photographs that are not top-notch, or no photographs at all, just brief glimpses that require a guess as to species. Field herpers know and accept that. But herpers do want to know what's in that log, under that rock, or in that hole. They often have to settle with just knowing that something is there. Particularly when the rock can't be flipped or the crack is too deep. Roger Carter wants to push his view into that crack or into that hollow log. And maybe help create more of those hiding spots. He titled his talk "Searching for Hidden Herps."

Roger Carter. Photograph by Dick Buchholz.

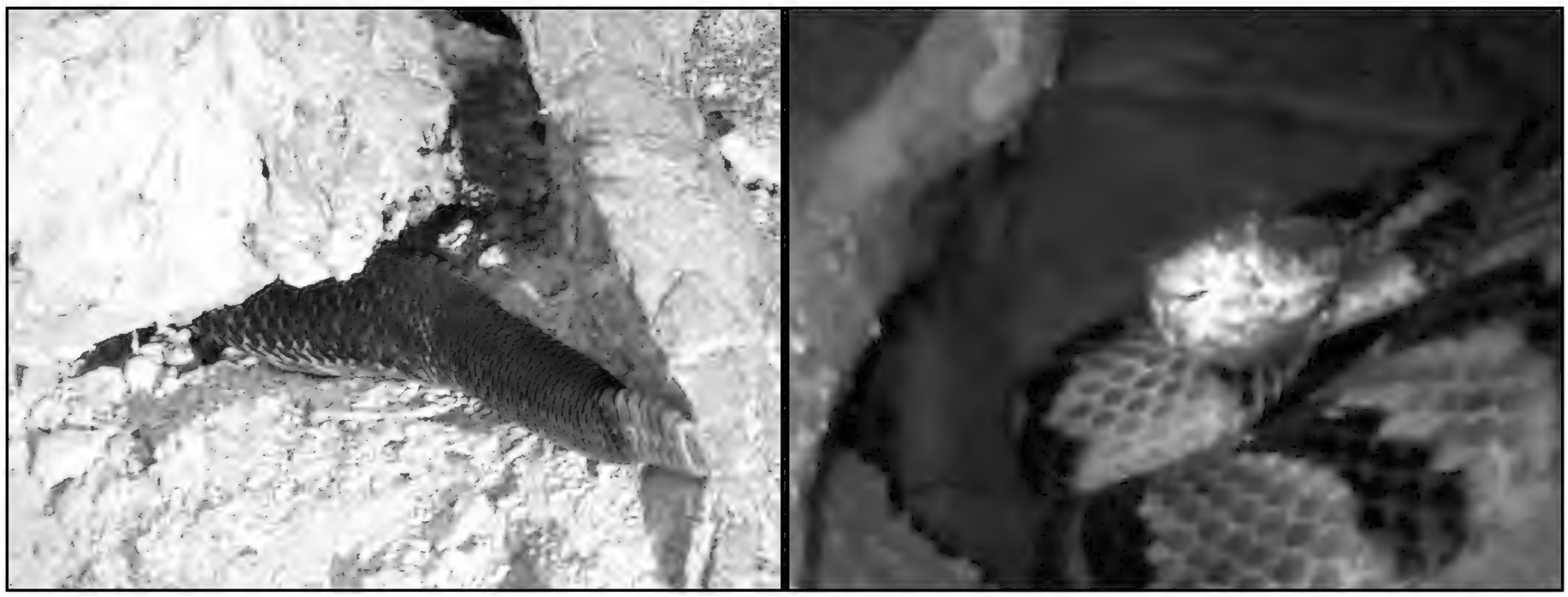
Roger and his wife Holly were very active in your society while they lived in the Chicago area from 1972 to 1989. They worked shopping center shows (a phenomenon that only the older members of the society remember) and participated in field trips. Holly became the first woman to serve as president of the CHS back in 1983. When they moved to Indiana they became active in the Hoosier Herpetological Society. Roger has served as president and is currently the treasurer. They have been exhibitors at many ReptileFests and regularly attend the Midwest Herp Symposiums.

Many herpers carry a flashlight and/or a mirror to peer into those dark spots that herps like to inhabit, but Roger wanted to go deeper than that and searched for something that would allow him to witness activity that would otherwise go unobserved. He finally found a small "spy" lens that attached to his camera with a thin cord and could be inserted into tight spaces. He showed us a short video of a copperhead that was his first find. Unfortunately, that set-up was incapacitated when Roger tried to explore a burrow that was full of water. He next purchased a Cen-Tech inspection camera from Harbor Freight Tools. It has a built-in screen and a tiny camera on the end of a four-foot long cord. After attaching the cord to a selfie stick, Roger was once again ready to plumb the depths.

Roger began showing videos of animals in some of their hidden resting places. First a toad in a hollow log for a trial run. Then still photos of Roger's two favorite trees in southern Indiana, both trees that had fallen and exposed the huge root balls at their bases. Roger has learned that these root balls are excellent places to look for snakes. We saw videos of timber rattlers, copperheads, and cottonmouths, some

Roger's first attempt with his second camera discovered this toad hiding within a hollow log. This is the opening shot of a short video.

Roger's two favorite trees in Southern Indiana. Plenty of holes to explore. Photographs by Roger Carter.



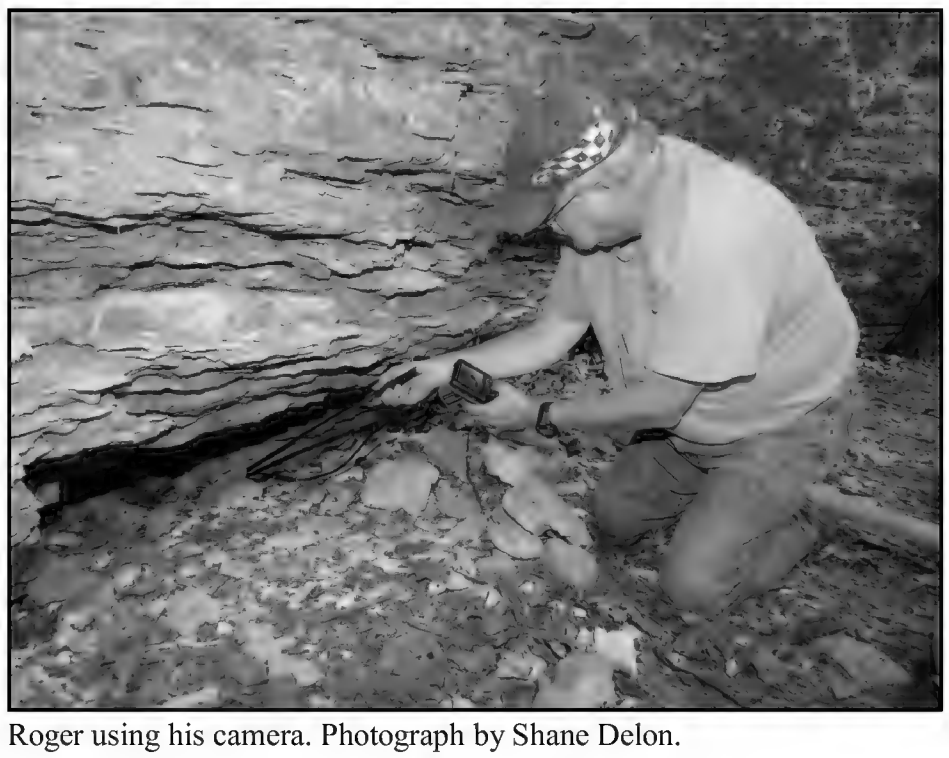
All too often the view on the left is all a field helper might get, but while the quality may suffer, as seen on the right an inspection camera can let you photograph what's attached to that tail. Photographs by Roger Carter.

curious about the weird intruder, some hostile, some retreating.

Of course, not all hidden herps are found with an inspection scope. Roger showed us photos of the frogs hiding in the gate-posts at both ends of snake road. He had nice pictures of timber rattlers in crevices along that road. And colorful pictures of cave salamanders, some taken with his inspection camera. He had nice pictures of a female timber rattler with young in a maternity den. Roger even demonstrated how hollow or rotten logs might be split and rearranged as hiding places, showing pictures of two copperheads that benefited from his ecoengineering.

He also showed another rig for crevice diving which used a cell phone. I have a similar system. One can search for endoscopes on the internet and discover a few for sale. Most I suspect are used for plumbing problems. I'd recommend not getting the longer cords because you will probably not be able to probe very deep into most cracks. Mine's about three meters and I've never been able to use the full length. It is waterproof, has good lighting, is lightweight and around $35. The transmitter must be charged and your phone must be charged, but it works over self-contained WiFi and delivers pictures of pretty good quality. As Roger recommends, I marked the top of the lens and the top of the cord in a few places so that I could keep the lens in a somewhat upright position. Otherwise the picture on your screen has no indication of up, which can be confusing. The cord is stiff enough that you may not need to attach some sort of rod. As with any piece of equipment, you will do yourself a service by practicing with your scope before taking it into the field.

It's always great seeing Roger and Holly, and his talk provided valuable information on searching for those really hidden herps. Say hello to the Carters the next time you see them at a symposium or ReptileFest. Go spy on some herps and maybe share some of your inspection camera photos with them.



Roger using his camera. Photograph by Shane Delon.

Roger placed a hollow half-log (half hollow log?) in the field as a "natural hidebox." And it worked! Photographs by Roger Carter.

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Some Early Adventures with 'Winders

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As has been mentioned in several of these columns, this author moved to the Tucson area in May of 1981. This author has also discussed going nearly seven years without making friends with *anybody* of herpetological bent here. Every possible attempt was made to break into the local herpetological circles, and every effort fell flat. The locals were rather tight-knit, and had good reason to mistrust outsiders. (The importance of protecting herpetological honey holes continues to promote silence in our region. As I am now an "insider," I understand the "why" of any cold shoulders received as an "outsider"). The formation of the Tucson Herpetological Society (THS) in January of 1988 opened doors to many herpetologically-oriented friendships for me. All of the friendships that this author acquired in the early goings of the THS were people much like me. What would one day be my core group didn't have any connections to the more established herpers of the region. We were outsiders who found each other, formed our own circle of friendship, and eventually, through time and participation, became insiders ourselves.
The best example of how this worked occurred in February of 1988, at the first meeting I attended. When I entered the meeting room, alone, there were circles of happy, chattering people who all seemed to know each other. I hovered on the fringes of these circles, hoping to be noticed, hoping to be included, but you know what? It just doesn't work that way! But in their defense, what were they supposed to do? "Oh! You must be *nobody*! Why don't we stop what we're talking about so that we can include *you*?" Newcomer social situations in herpetological circles are ***tough***! As Jim Morrison of the Doors once sang "People are strange, when you're a stranger, faces look ugly, when you're alone . . . " It's really hard to *not* include "Women seem wicked, when you're unwanted . . . " along with that scenario.

So, when the meeting started, I took a seat—the only person in my row. A thin, younger guy sat down two seats from me. He was also alone. The presentation was excellent, the question and answer session ended, and everybody gathered in their groups. The skinny dude stood up, and I stood up. We both looked around the room and saw the hopelessness of getting a word in edgewise with any of these people. Our eyes locked, we shook hands, and the dialogue started. That is how I met Dennis Caldwell. We soon found we had much in common. He had grown up in Naperville, Illinois, and had recently transplanted to Tucson. We were soon discussing snapping turtles and garter-snakes, leopard frogs and salamanders. We switched to the Tucson herping, and he expressed a strong desire to find Banded Geckos (*Coleonyx variegatus*). As that was one of the few herps that I *had* learned to find, I passed along some tips. When we parted company that night, I had no idea that my future best friend and constant herp buddy had just entered my life. A month later, at the next meeting, Dennis introduced me to his wife, Jamara. (See Figure 1, and note how this lazy herpetologist avoids the pain of writing physical descriptions). They were the perfect couple, and I found talking with Jamara equally as light and easy as with her husband. They had followed my gecko-finding advice, and found many. As I had just led them to geckos, they seemed to think I had some form of great herping prowess. (I did little to dissuade them of that notion). While we continued to develop our friendship together, we also earnestly tried to link into other circles. The main thrust of our efforts at pushing the herpetological easy button was in finding a wild Gila Monster. When nobody seemed interested in giving us the golden key to the herpetological outhouse, we turned to each other with the attitude of "*screw* the experts. Let's go find one on our own!" By the time April rolled around, we were also rolling around, and finding what later proved to be the stomping grounds that I still herp to this very day.

There were many surprises during those early efforts at finding our first Gila Monster. The first *big* surprise came our way in early June of 1988. It is here that your author will give pause for long enough to explain something to the reader. As Bob Seger once crooned, we were "working on mysteries without any clue." (While practicing our own version of "Night Moves" in the process). "Night Moves" describes the process nicely, as we were about to go nocturnal with our efforts. We were completely in the dark about what we were doing. And to this very day, I remain in the dark about exactly what was done, as well as precisely when we did it. That is because none of us were writing anything down. From our first outing in April 1988 until mid July of 1989, I have nothing to show for the single most exciting phase of my life. Our first Gila Monsters (*Heloderma suspectum*), Mountain Kingsnakes (*Lampropeltis pyromelana*), and Ridge-nosed Rattlesnakes (*Crotalus willardi*) came and went. Other than a few fading 35 mm slides, exact particulars of the *when* aspect of the big finds are dependent on a memory that is fading faster than the images. That all changed on 18 July 1989. That is when my herp journals began, and other than a few short lapses, have continued to this very day. Oddly enough, *nobody else* in my circles of local friends has

Figure 1. Dennis Caldwell, Jamara Tucker, the author, and the mighty red Toyota pickup that was our chariot of fun for so many herping adventures. Image by Jamara Tucker, 5 May 1990.

done this sort of thing. (We include *many* academics with the "nobody" in that previous sentence). Without the documentation, herping wouldn't be the same for me. I would have quit herping years ago if I had not been keeping score. The documentation, both with words and images, is the driving force in continuing my passion.

While I may not have been taking notes, I *do* know that the biggest surprise find to ever pass before my eyes happened during the first week of June 1988. I firmly believe that the find so floored me that "early June" would still be burned in my brain even without benefit of the write-up of this particular trip in hand. During the year 1992, I began to chronicle the early herpetological efforts of our core group. In short, I was writing a book—and I was writing it specifically to get it all down on paper before *everything* was forgotten. This book, that never happened, was going to be called *Herping Arizona*. I got through seven chapters before I stopped. What is about to follow in this column was contained in Chapter 2, which was entitled "The Early Days."

By now, the reader is doubtlessly hopping up and down while wetting both pant legs and shouting, "So Repp, what was it that you found in June of 1988?" I'm *really* glad you asked! We found our very first Sonoran Desert Sidewinder (*Crotalus cerastes*). (From this point on, we mostly call 'em 'winders). To show how green I was at the time, I had no idea that they could be found within a half-hour of my house. I don't think I even knew that they could be found in Arizona! What did that first 'winder mean to me? Once again, the author is grateful to the reader for asking such a question. What astute readers you all are! And you even asked knowing full well that a long story was about to unfold? Bravo!

We go back to Sweet Home Illinois, in the year 1961. I was in the first grade. On the last day of school, the somewhat exasperated teachers (who didn't know what else to do with us) gathered the entire group of 700 or so first- to fifth-grade kids into the school auditorium. They showed us the 1953 classic Disney film, *The Living Desert*. The entire film left a vivid impression in the mind of a budding young herpetologist. There were two sequences in particular that remain burned in my brain to this day. The first was a of a cutesy little Kangaroo Rat bounding gaily about the sandy desert floor. See the K-Rat hop! Hop! Hop! Hop! See the K-Rat hop too closely to the Sidewinder, which in turn zips a quick strike in the direction of the foolish little hoppy vermin. See the strike! Strike! Strike! Strike! See the snake miss! Miss! Miss! Miss! It wouldn't be proper to see a close relative of Mickey Mouse (whom I hated then and *still* hate now) get hammered, and subsequently hemorrhage out of every bodily orifice, would it? Hear the little first grade herper cry foul. "Foul! Foul! Foul!" Even at an early age, I was all about admiring a good thrill kill of cutesy critters. And while I'm bitching about *that*, let us not forget the number of times the "evil" snakes get ripped asunder by various predators in this film. Another memorable sequence showed a 'winder undulating in slow motion upward on a steep sand dune. Each rhythmic churning motion of the snake caused little rivulets of sand to cascade downward from it. And for the next 30 years of my life, I believed heart and soul that 'winders moved in slow motion, painting pretty pictures in the sand as they did. From the tender age of six years old and up, seeing my first wild 'winder meant a lot to me.

Getting back to early June of 1988, and the no-longer-a-surprise discovery, Dennis was driving his 19-0-junk Honda Accord LX that night. Jamara occupied the back seat, generously yielding the shotgun seat to me. Our trip was to take us up I-10 to the northwest of Tucson, where we would turn onto a wide gravel road that led eastward. We had timed the trip so that the setting sun would be at our backs, theoretically blinding our approach to anything that might be in our path. As soon as Dennis negotiated the right turn on our designated thoroughfare, we slowed down to what we thought was the appropriate speed for road cruising. At no point for the remainder of the evening did we exceed 15 miles per hour while on the back roads. Even at that nearly imperceptible crawl, we found our first snake within a matter of minutes. Dennis eased 0-junk off to the side of the road, and stopped about 20 feet in front of the snake. The fumbling that followed was epic. I could not figure out where the 0-junk door handle was, and Dennis was freaking out over not being able to find his camera. But in the end, we found ourselves looming large above the snake.

We were staring down at a tawny tan and brown serpent that was roughly 18 inches long. Its body was poised in an S shape, the broadside of the S going the direction of the road. This was an atypical posture to our eyes, which were accustomed to seeing road snakes stretched straight out, perpendicular to the grain of the road direction. The head, which was facing away from 0-junk, sprouted a horn above each salmon-colored eye. Said eyes each contained a thin slit of a vertical, black pupil. An all-black, forked tongue flickered daintily in and out of the horned head. At our approach, the snake indicated an awareness of our presence by flattening itself to the gravel road surface. It was roughly the thickness of cardboard, and in its flattened state, nearly two inches across the mid-body (Figure 2).

I don't know how long we stared at the 'winder before I pronounced it to be one. "Whoa, it's a Sidewinder," said I, and blatantly showed my ignorance by continuing with "I didn't know we could find them around here." "We could fill books with what you don't know," Dennis shot back, which in turn evoked a hearty "Shut up, Dennis" out of Jamara. That was the first "shut up, Dennis" of many to emanate from Jamara's gullet this evening. I always appreciated hearing Jamara tell Dennis to shut up, as it saved me the trouble. My whole reaction to this find was *much* less animated than normal for me. The truth is, I was caught so *completely* off guard by seeing this unexpected thrill of a snake that I couldn't find the words!

It occurred to me that perhaps I should have my snake tongs handy for the upcoming fondling phase of the find. While Dennis took a knee and began firing away with his camera, I turned around and received my second surprise of the evening. The 19 0-junk Accord, which had been right behind me when I stepped out, was now rolling backwards down the road, and was well over a hundred feet away! I had time for a hearty "WTF!" exclamation, which was followed by a lightning fast wind sprint. "Oh, by the way . . . " Dennis hollered at my rapidly retreating back, "I forgot to tell you that the emergency brake doesn't

work!" (That thought *had* occurred to me prior to this spoken goldmine of information). After a somewhat exasperating chase, I caught up with the rolling junker, and grabbed the front bumper with both hands. A new sport was invented in the process, which I call "sand skiing." I dug both of my heels into the gravel road substratum, and my tennis shoes carved parallel furrows in the dirt for another 30 feet or so. I eventually persuaded 0-junk to grind to a whimpering halt in this fashion. That being done, I hopped into the driver seat, and pulled 0-junk forward to be closer to the action again. I put her into first, and shut the engine off.

I once again approached the couple with my four-foot-long Pilstrom snake tongs in hand—a case of serious overkill. I was prepared to vent (in a *most* derogatory fashion) my inner feelings about having to run down their wayward *turd* of a vehicle. But when I saw Dennis staring at his camera, shaking his head, and repeatedly muttering "*I can't believe this . . .* " over and over again, I instead snapped out something like: "Well, are you going take some pictures, or talk to yourself all night?" "*I can't believe this,*" he said for the tenth time, "*I forgot to bring film*!" I looked at Jamara, Jamara looked at me. We both looked at Dennis. All verbal hell was about to break loose, but the contrite look on Dennis's visage put a stop to anything I was about to say. Jamara began to giggle, I broke into a belly laugh, and we all had a good laugh over it all. Jeez! I wait 30 years to see my very first-ever Sidewinder, and *he* forgets to bring film?

So, now we have a nice 'winder in front of us. Taking photos is out of the question. What does one do under such circumstances? Why, we wanted to see it 'winder, of course! Without giving it much thought, I gave the snake a little nudge with the end of my tongs. When I did so, I expected to see the slow-motion 'windering of that Sidewinder in the Disney film. What happened instead was a mini-explosion of sorts, followed by what could best be described as ground-hugging greased lightning. Jamara was standing about six feet in front of it, and that snake jetted across the distance in less than a split second. So fast and unexpected was the motion of this snake that she barely had time to clear out of the way.

"Asshole!" She exclaimed as the snake rocketed past her. "What are you trying to do, get me killed?"

"Like I was supposed to know it was going to do *that*?" I defensively replied. "Besides, this a herp trip. Keep your wits about you, or you'll get hurt!"

"Yeah, well, I didn't expect that you were going to throw the thing at me."

"I didn't throw the thing at you. I barely touched it." My response went firing back, "Dennis! Make your wife stop picking on me!"

"Ok! Jamara, stop picking on Roger," came his response. Then, he turned to me: "There, how was that?"

"Shut up, Dennis!" Jamara exclaimed. Undaunted, I continued my verbal assault on Jamara.

"She called me an asshole, too! Make her stop calling me an asshole"

"Stop calling Roger an asshole, Jamara. He is one, but he *is* our guest tonight."

"Jeez, way to come out from under the bed, Caldwell" I snidely stated. "We sure know who wears the pants in *this* family."

"Shut up, Repp," they both uttered in unison.

Once the good natured squabbling was behind us, we still had a Sidewinder to deal with. After jetting by Jamara, the 'winder stopped, and resumed the flattening exercise. We admired it for a while longer, and then, we guided it off the road. We kicked some sand and gravel at it as it crawled away, hoping to make its road experience as nasty as possible. We hoped that this otherwise harmless act might discourage it from entering the road in the future. And the cruise continued. As soon as darkness descended upon us, the Kangaroo Rats began making their presence known. To say they were legion in number would be an understatement. There were so many that at first, Dennis was steering erratically through the swarms, and hitting some while trying to avoid others. He finally resolved to keep 0-junk on a steady and straight course. As soon as this tactic was set in motion, the K-rats—which appeared to be confused by the headlights—began charging straight under the tires. As we began to hydroplane on roo-rat guts, the little popping sounds of them meeting their maker filled the interior of the vehicle. Each "pop" was a knife through the hearts of my companions, who were both fanatical lovers of wildlife and nature. Dennis slowed to an imperceptible crawl, and still the confused little beasts kept hurling themselves in harm's way. I finally snapped: "***C'MON CALDWELL***! Forget these little kamikaze K-rats. Get this crate rolling, lest we be out here all night!" The term "kamikaze K-rats" caught on, and became the motif of the evening. It helped to keep our sinking spirits high, and added humor to an otherwise dreadful situation. (It is downright depressing to add here that this author continues to cruise this network of backroads even as these words are being published. I have not seen any more than ten kangaroo rats in an evening here in over three years! The droughts of 1996 and 2002, along with increased traffic, have brought about a *serious* whammy to the local rodent populations. My turf is being ripped asunder, and there is not a *damn* thing that I can do about it).

In time, the unmistakable form of a Sidewinder cranking slowly away from us was picked up by 0-junk's high beams. Dennis and Jamara hopped out, while I fumbled in the dark to find my snake tongs and flashlight. Once these were gathered, there came a rather frantic search for the door handle—which was considerably more difficult to find in the dark. As all the fumbling and cursing was ensuing, 0-junk, which had been stopped aiming upward on an incline, began to roll backwards. When I stepped out, I was already out of balance, and my feet expected stable ground beneath them. They instead connected with ground that was moving. This caused me to lose my balance, and the open door knocked me off my feet. I had just enough time to look up from the ground to view the open door coming right at me. I prepared for impending doom by trying to flatten myself against the road—behavior much as I had just witnessed from our first Sidewinder. It was my only defense. The door passed harmlessly over my feet and legs, but snagged on the rather impressive protrusion of my beer gut. In short

order, I was being dragged backwards by the murderous junker. The loose road sand began packing that opening between my pants and back, and in no time flat, was also cascading into my underwear. This in turn created a dreadfully uncomfortable, lumpy and sand-clogged wedgie. Eventually, the 115-kilogram mass of a Simon-pure lardass overcame the momentum of the free-wheeling piece of crap, and together we ground to a halt. I slowly extracted myself from the situation, dropped my pants, and began scooping an entire sandbox of grit out of my underwear and butt crack. Just as this was transpiring, Dennis looked back, gave me the stink-eye, and uttered:

"This is *not* the time to be playing with yourself, Roger! Get up here and help us with this Sidewinder!" My reply was not fit for publication in this or any other medium. Let's just say that it was not complimentary—to either 0-junk, or Dennis.

To continue on with this particular evening would just be more of more of the same. There were more kamikaze roo-rats, more snakes found, and more afterglow of a remarkable evening in all respects. As nothing was written down about this otherwise *stellar* (numbers-wise) road cruise, I rely on my words of the unpublished book of 1992 to report that we encountered the following snakes that night: 4 Sonoran Sidewinder (*Crotalus cerastes*), 2 Western Diamond-backed Rattlesnakes (*Crotalus atrox*), a Sonoran Gophersnake (*Pituophis catenifer*), 1 Spotted Leaf-nosed Snake (*Phyllorhynchus decurtatus*), and 1 Saddled Leaf-nosed Snake (*Phyllorhynchus browni*). Numbers like this are no longer possible on the network of roads we traveled that night. We also made a series of turns that night that led us down many side roads, one of which later proved itself to be so productive that we named the four-mile-long Jeep Trail "Old Faithful." We will speak much of this road in future columns.

But before wrapping up this introductory column on Sidewinders, I have one more interesting observation to offer. It happened on a road cruise that ensued a short time after. By this time, Dennis and Jamara had gotten rid of 0-junk, in favor of a nice little Toyota pickup. (Figure 1). The event about to be described happened on Old Faithful, which we had begun to use as a favored road-cruising destination. Dennis was driving, and Jamara and I were standing in the bed of their new truck. All parties involved spotted a 'winder that was methodically crawling straight towards us. It was nearly 50 meters away when we first saw it. Dennis shut the truck down, and turned off the lights. Jamara turned her flashlight off as well. I hopped out of the bed, my own flashlight in hand. I had the flashlight on, but turned downward toward my feet. I put myself directly in the path of the distant, oncoming serpent. I would occasionally shine my light in the snake's direction, immediately pulling the light off it soon as its progress was visually marked.

So thusly, in the starlit silence of this remote and pristine slice of desert, we witnessed the fluid movements of a Sidewinder on the prowl. The snake's pace was not one of haste, but rather, one that depicted a sense of determination to keep advancing. It seemed to be moving in purposeful fashion toward an unknown destination. And whatever that destination was, it appeared to be behind and beyond any obstacle in its path. On and on it approached, its rhythmic, churning body action adeptly eating up the real estate between us and it. It soon became apparent that it was coming straight toward the ground between my legs. Throughout the final approach, the 'winder remained oblivious to my presence, or that of the truck, or anything else before it. Its rippling body was now ten feet away. Without any change of speed or direction, it was now three feet away, and still coming on strong. Then it was two feet away . . . one foot away . . . and now, it was directly between my legs. Its head was inches away from my right foot. And then, without breaking stride, and without missing a beat, it launched a snippy little strike at my big toe. How I got out of the way, I'll never know, but I moved my right foot in just the nick of time. It was WAY-TOO-CLOSE!

"You *idiot*!" Jamara cried from her lofty perch in the bed of the truck. "It almost got you!"

'Relax, woman!" I retorted, with macho bullshit emanating from every pore in my body, "I saw that coming from a mile off."

'Yeah, right!" Dennis piped, "now go clean out your underwear! Phew-i-e-e-e, it smells like shit out there!"

They were both right. It was an idiotic move on my part to stay put, and the atypical reaction of the snake caught me by *complete* surprise. There was nothing but a thin layer of cloth separating my big toe and the strike of that snake. How I got out of the way in time still remains a mystery. The experiment could have been a painful lesson on why one should *always* expect the unexpected when dealing with a venomous serpent. But even more amazing is that the snake continued, with nary a backward glance, to continue 'windering its way past us—on its way to better things. Where it was going, why it chose to go right through me in the process, and why it continued onward after the strike will always be a mystery. This author is looking forward to discussing more adventures with Sidewinders in future columns. The set-up for that future column is now complete.

For now: This here is Roger Repp, signing off from Southern Arizona, where the turtles are strong, the snakes are handsome, and the lizards are all above average.

Figure 2. A Sonoran Sidewinder (*Crotalus cerastes*) in typical road posture. As we did not have a functioning camera to photograph the very first one we ever found, this one is a stand-in. Image by the author.

Minutes of the CHS Board Meeting, October 19, 2018

Rich Crowley called the meeting to order at 7:40 P.M. Board members Dan Bavirsha, Lawrence Huddleston, Zac Oomens and Jessica Wadleigh were absent. Minutes of the September 14 board meeting were read and accepted.

Officers' Reports

Treasurer: John Archer presented the financial reports for September. The CHS account with Meetup.com has been closed.

Media secretary: Kim Klisiak reported that she will be working on the Junior Herpers web site first. She will give a few board and committee members access to the draft to get additional input. She is checking into Corporate Dropbox—is it feasible for us? Advertisement cards for ReptileFest 2019 are in the works.

Membership secretary: Mike Dloogatch read the list of expiring memberships.

Sergeant-at-arms: Mike Scott reported 25 in attendance at the September 26 general meeting.

Committee Reports

Shows: Gail Oomens will try to get email addresses so she can ask Junior Herpers to help out, especially at kid-oriented shows and pet expos.

ReptileFest: Frank Sladek reported that several first-time vendors really liked 'Fest and are wanting to come back. We will use Eventbrite again this year for online ticket sales, and we hope to use more of their features this year. Frank will strive to contact nature centers earlier this time.

Junior Herpers: October meeting was canceled due to the Chicago Marathon. James Krause will speak at the November meeting.

Library: Joan Moore has ordered two newly released books: *Cane Toad Wars* by Rick Shine, and *Peterson Field Guide to Western Reptiles & Amphibians*, fourth edition, by Samuel M. McGinnis and Robert C. Stebbins,

Grants: Mike Dloogatch moved that the Society continue our grants program in 2019. Kim Klisiak seconded the motion, which was unanimously approved. Funds to be allocated after the start of the new year.

Old Business

Insurance: Snakebites are not covered under our new liability policy. Exhibitor guidelines will be enforced. Reticulated and African rock pythons must be caged.

Midwest Herpetological Symposium in Indianapolis was enjoyed by the CHS members who attended. Several of the speakers could be invited to speak at our general meetings.

New Business

A producer of videos, connected with Animal Planet, has contacted Frank Sladek about possible hosts for some of their episodes.

The meeting adjourned at 9:58 P.M.

Respectfully submitted by recording secretary Gail Oomens

Turtle Poetry: On Chasing Blanding's Ghost[1]

Sean M. Hartzell
Bloomsburg, PA 17815
seanhartzell77@gmail.com

Upon the wake of summer's rise
I wish your form to grace my eyes
Old yellow throat where can I find thee!
Piece of the marsh you still should be
Where have you gone? I've tracked you near
But hope that you are still "truly" here
By Erie shores are you still found?
Or have you gone, a ghostly shroud?
The hoops are set, my passion strives
Will I find that you still thrive?
Old Atkinson[2], a century more
Found you south of Erie's shore
But are you there? And are you here?
And still I chase your ghost so near
Our Commonwealth, my expanse dear
Our treasure lost if you leave here

1. Composed while participating in Blanding's Turtle (*Emydoidea blandingii*) survey efforts in Pennsylvania with the Pennsylvania Fish and Boat Commission; special thanks to Christopher A. Urban for encouragement and support.

2. Netting, M.G. 1932. Blanding's Turtle, *Emys blandingii* (Holbrook) in Pennsylvania. Copeia 1932(4):173-174.

Advertisements

For sale: **highest quality frozen rodents**. I have been raising rodents for over 30 years and can supply you with the highest quality mice available in the U.S. These are always exceptionally clean and healthy with no urine odor or mixed in bedding. I feed these to my own reptile collection exclusively and so make sure they are the best available. All rodents are produced from my personal breeding colony and are fed exceptional high protein, low fat rodent diets; no dog food is ever used. Additionally, all mice are flash frozen and are separate in the bag, not frozen together. I also have ultra low shipping prices to most areas of the U.S. and can beat others shipping prices considerably. I specialize in the smaller mice sizes and currently have the following four sizes available: Small pink mice (1 day old—1 gm) , $25 /100; Large pink mice (4 to 5 days old—2 to 3 gm), $27.50 /100; Small fuzzy mice (7 to 8 days old—5 to 6 gm) , $30/100; Large fuzzy mice / hoppers (10 to 12 days old—8 to 10 gm), $35/100 Contact Kelly Haller at 785-234-3358 or by e-mail at kelhal56@hotmail.com

Herp tours: **Costa Rica herping adventures**. Join a small group of fellow herpers for 7 herp-filled days. We find all types of herps, mammals, birds and insects, but our target is snakes. We average 52 per trip, and this is our 10th year doing it. If you would like to enjoy finding herps in the wild and sleep in a bed at night with air-conditioning, hot water and only unpack your suitcase once, instead of daily, then this is the place to do it. Go to our web-site http:// hiss-n-things.com and read the highlights of our trips. Read the statistics of each trip and visit the link showing photos of the 40 different species we have found along the way. E-mail at jim.kavney@gmail.com or call Jim Kavney, 305-664-2881.

NEW CHS MEMBERS THIS MONTH

René Clark
Meaghan Gade
Patrick and Cary Grimes
Angus Brinkman Lowe
Scott Zonis
Adam Clause

UPCOMING MEETINGS

The next meeting of the Chicago Herpetological Society will be held at 7:30 P.M., Wednesday, October 31, at the Peggy Notebaert Nature Museum, Cannon Drive and Fullerton Parkway, in Chicago. This meeting will include the annual election of officers and members-at-large of the CHS Board of Directors. In addition, **Maggie Solum**, a keeper at the Fort Worth Zoo, will speak about "Crocodilian Cognition and Learning."

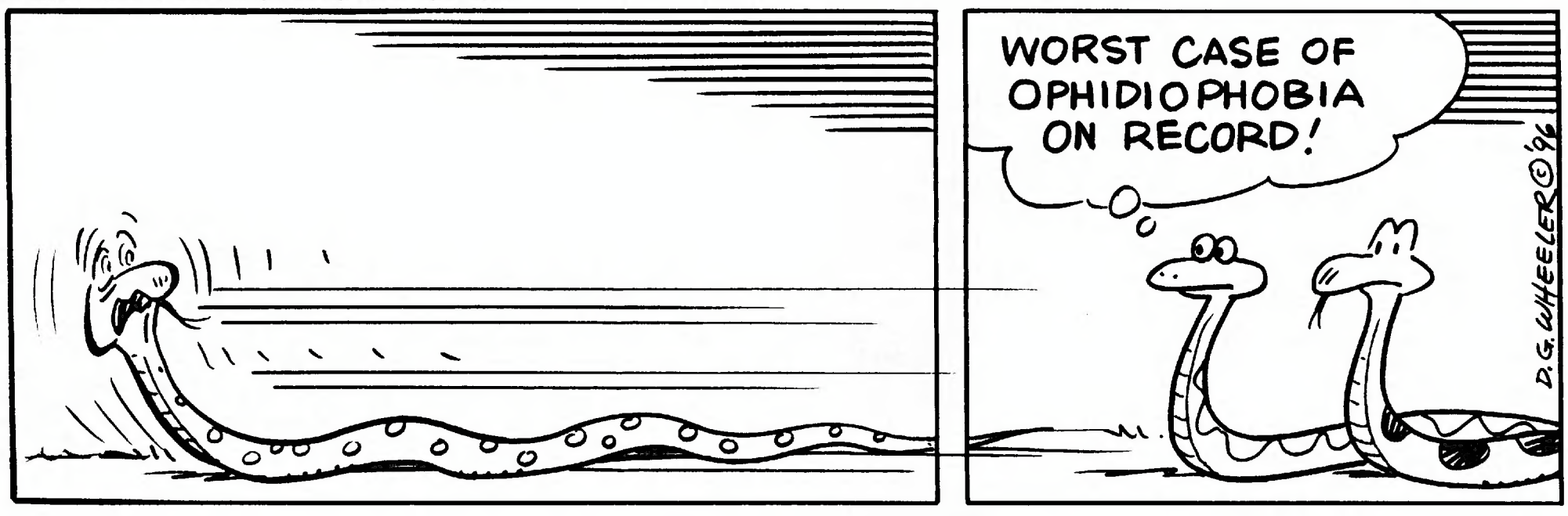
The December 26 meeting will be a holiday party. The CHS will provide soft drinks and snacks. If you would like to bring something edible to share with the group, you are invited to do so. If you would like to bring an animal to show off to the group, you are encouraged to do that as well. This will be a chance to socialize all evening and get to know your fellow members a little better.

The regular monthly meetings of the Chicago Herpetological Society take place at Chicago's newest museum—the **Peggy Notebaert Nature Museum**. This beautiful building is at Fullerton Parkway and Cannon Drive, directly across Fullerton from the Lincoln Park Zoo. Meetings are held the last Wednesday of each month, from 7:30 P.M. through 9:30 P.M. Parking is free on Cannon Drive. A plethora of CTA buses stop nearby.

Board of Directors Meeting

Are you interested in how the decisions are made that determine how the Chicago Herpetological Society runs? And would you like to have input into those decisions? If so, mark your calendar for the next board meeting, to take place on December 14, 2018. The venue is as yet uncertain, so if you wish to attend please email mdloogatch@chicagoherp.org.

THE ADVENTURES OF SPOT



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